3.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed action and the alternatives considered by the Department of Energy for TRU waste management at SRP.

3.1 PROPOSED ACTION

The proposed action is to process and ship certified TRU waste to WIPP near Carlsbad, New Mexico. Retrieved TRU waste and newly-generated TRU waste requiring processing prior to certification will be processed at the new TRU Waste Processing Facility (TWF). The proposed action includes construction of this new TWF facility in H-Area. TRU waste retrieval activities will occur in the SRP burial grounds (643-7G, 643-28G, and 643-G).

The SRP TRU Waste Management Plan has been developed to process all newly-generated and existing TRU waste in interim storage for either shipment to WIPP or reclassification and onsite disposal as low level waste. Figure 3-1 outlines the overall plan.

3.1.1 TRU WASTE FACILITY DESCRIPTION

The TWF facility will consist of a new building, a ventilation system with high efficiency filtration, and additional equipment necessary to retrieve and process TRU waste at SRP for shipment to WIPP. The waste will be retrieved from storage and transported to the TWF facility. The TWF facility will vent, purge, x-ray, and assay the storage containers; size-reduce the large waste not suitable for shipment as is; solidify free liquids, resins, and sludge; and repackage the waste to meet WIPP waste acceptance criteria.

The TWF process building will be a two story concrete and sheet metal building with an explosion-hardened area. There will be interconnected, ventilated remote processing areas with shielding walls where the waste drums will be punctured, and any H_2 gas vented while purging with inert gas. The containers will then be x-rayed and assayed and the waste and waste containers will be sorted and size-reduced as required. The design includes shipping, receiving, and storage areas, clean and regulated personnel change facilities, a regulated maintenance area, electrical and instrument control rooms, health protection facilities, and a building exhaust system. Figure 3-2 shows the facility floorplan.

Building features include:

- A high efficiency filtration building exhaust system
- A closed circuit monitoring system for viewing of remote operations
- Master/slave manipulators and gloveboxes

FIGURE 3-1: SRP TRU Waste Management Plan

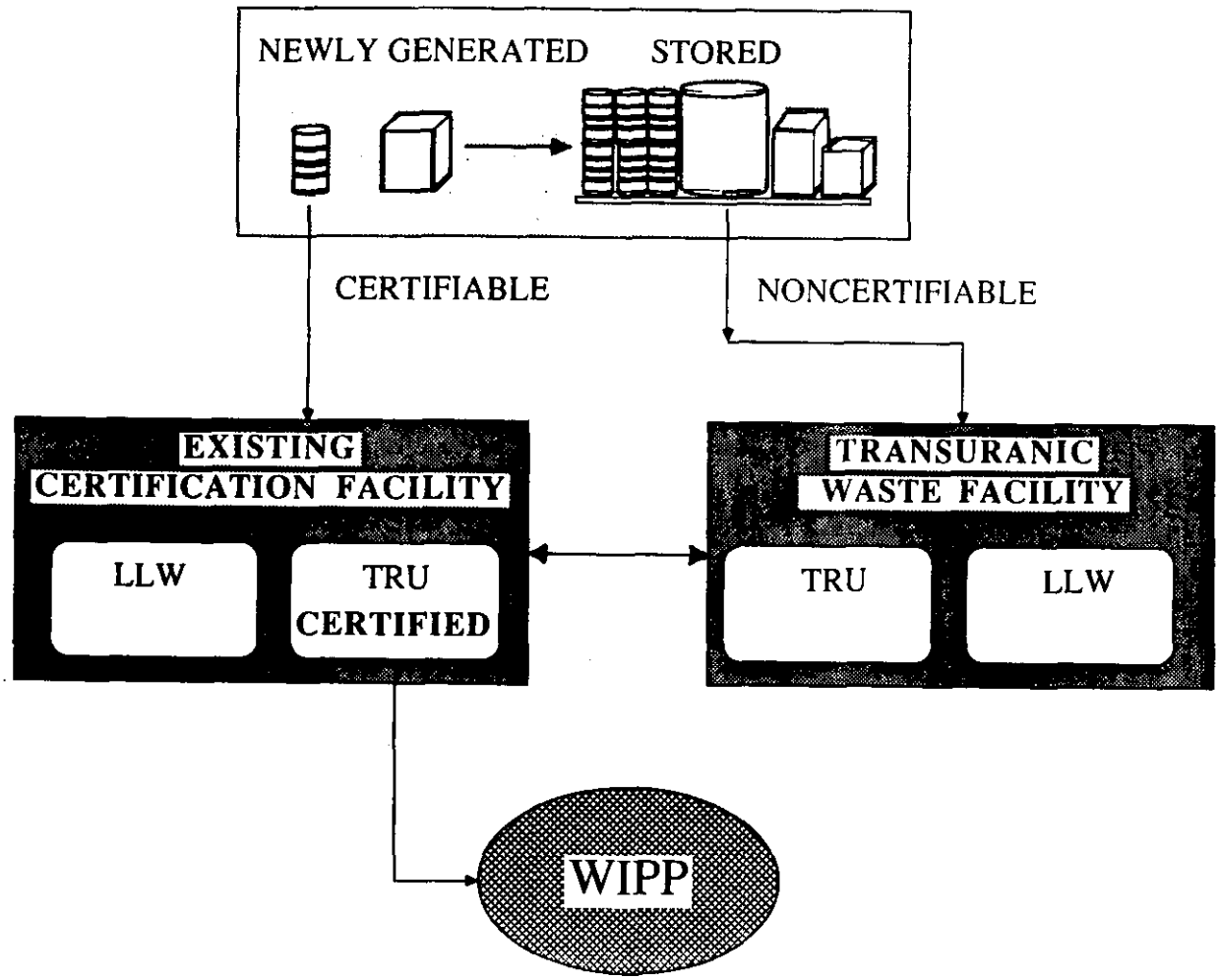
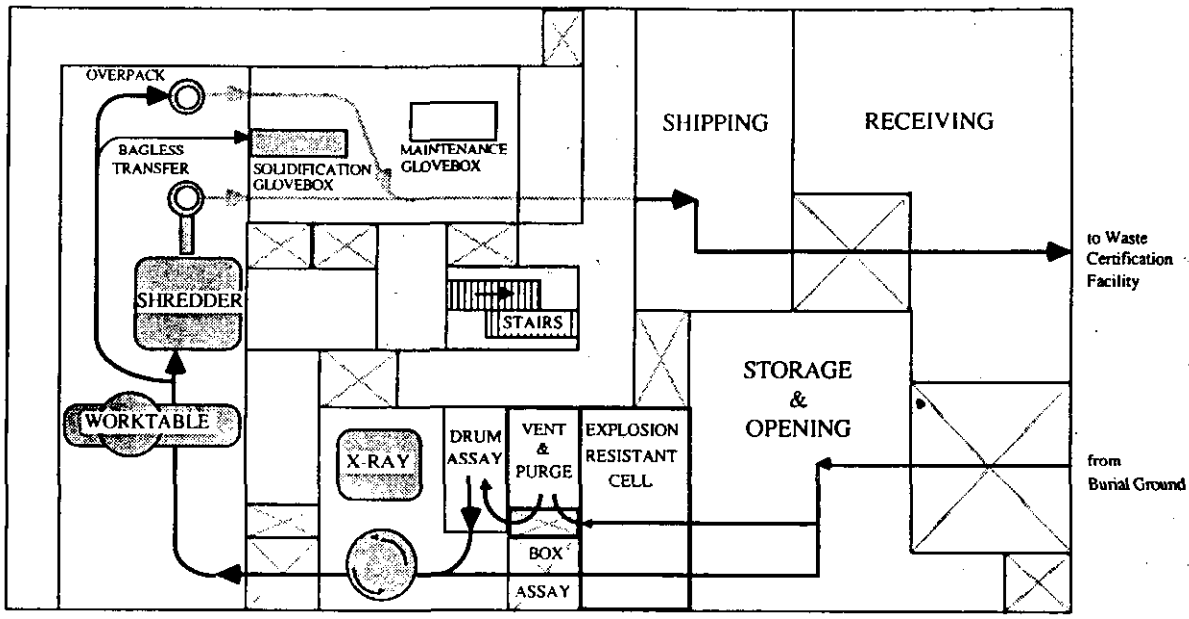


FIGURE 3-2: Transuranic Waste Facility
Conceptual Floorplan

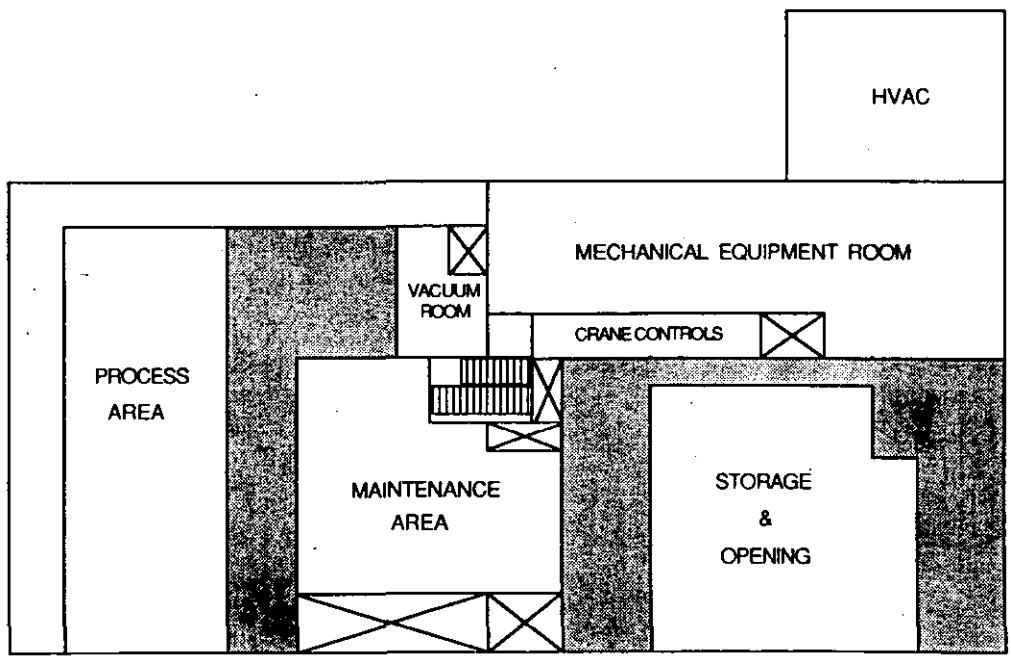
TWF PROCESS FLOW



TRU WASTE FACILITY LAYOUT

SECOND FLOOR

SHADED AREA IS SERVICE DECK



- Air locks between areas with differing contamination potential
- Emergency power for critical process and monitoring equipment
- Fire detection, alarm and suppression equipment.
- Assay equipment for both 55-gallon drums and plywood boxes
- X-ray equipment for waste containers.
- An electric, in-cell worktable
- A heavy-duty, computer controlled manipulator (telerobot) and associated size reduction tools, including a plasma arc torch
- A shredder to reduce materials to accommodate 55-gallon drums
- Bagless drum-out systems
- A centralized vacuum cleaner
- Plexiglass and lead shielded viewing windows
- Gloveboxes and equipment for solidification process.

3.1.2 PROCESS DESCRIPTION

Heavy earthmoving equipment will be used to remove the four-foot soil cover over the stored TRU waste pads to within 6 to 12 inches of the waste containers. The remaining soil will be removed with the remotely operated, HEPA-filtered soil vacuum. The drums will be removed from storage using a shielded lifting canister. The canister will fit over the drums to protect personnel in the event of an explosion and will control any contamination released. The drums will then be placed in an explosion-resistant cask and transported to the TWF process building. Large steel boxes and concrete culverts will be lifted from the pads and placed directly on a transport trailer for shipment to the TWF building.

Waste containers will be received at the TWF facility through an airlock into a high bay storage and opening area. Large steel boxes will be opened in this area, and plywood boxes within the large steel boxes will be removed to be processed individually through the facility. The shielded drum transportation cask and the culverts will be placed into an explosion-resistant area. In this area, culverts will be opened remotely, drums will be removed individually and placed into a cell where the drum will be vented, purged with inert gas, and fitted with a filter vent before going to the verification area. Any gases vented from the drums will go to the building exhaust system.

In the verification area, drums and boxes will be assayed to determine curie content for inventory control and record purposes. Each container will then be x-rayed to identify any objects that do not meet WIPP waste acceptance criteria.

After x-ray, containers with objects not conforming to WIPP criteria will pass through an airlock into the remote waste preparation cell. This cell has lead-shielded viewing windows and a remote operator's console. All waste preparation activities will be performed remotely with the aid of a telerobot. This robot will handle several tools, including a plasma arc torch, to size-reduce large objects. The telerobot will remove any objects identified in the x-ray process that do not meet WIPP criteria. An electric worktable will be provided so that the telerobot can work on large, bulky objects.

Drums and other pieces of equipment may be placed in a shredder for size-reduction. Some smaller equipment will be placed directly in a drum overpack for removal using bagless transfer systems. These systems will significantly reduce the amount of waste generated during the bagout operation by eliminating the need for drum liners and plastic bags. Operations in this cell will be completely remote and can be viewed through lead shielded windows. A closed circuit television will also provide localized viewing of individual equipment operations.

Waste forms segregated as requiring additional processing, such as HEPA filters and respirable fines, will be stabilized or solidified in the TWF facility to meet WIPP criteria. An in-cell vacuum cleaning system will remove dust and contamination. Drums of processed waste will be removed from the processing area using the bagless transfer system and transported to the shipping area where they will be prepared for shipment to the Waste Certification Facility (WCF). In the WCF drums will be classified as low level waste or WIPP-certified waste.

Assuming a processing rate of 15,000 cubic feet of stored waste per year, retrievably stored TRU waste will be eliminated in 16 years. After that, the TWF facility feed rate will be reduced to 6,200 cubic feet per year of newly-generated waste requiring processing to meet WIPP criteria.

The high efficiency filtration building exhaust system may include a sand filter. The sand filter would consist of deep beds of rock, gravel, and sand constructed in layers which vary in granule size from layer to layer. The flow through the filter would be upward and the granules decrease in size in the direction of the airflow. An underground concrete duct would connect the TWF building to the sand filter.

In WCF, waste will be assayed to determine if it is low level or TRU waste. TRU waste will then be x-rayed to verify that it meets WIPP criteria. Low level waste will be disposed of onsite. This assay/certification facility is in initial operation as an experimental TRU Waste assay facility (ETWAF). When this facility is fully operational, it will compliment the TWF which will prepare drums for shipment to WIPP. Until WIPP is operational, all certified drums of TRU waste will be sent to interim storage in the burial ground to await shipment to WIPP.

3.1.3 TRANSPORTATION OF CERTIFIED TRU WASTE

Drums of certified TRU waste will be transported from SRP to WIPP in a TRUPACT (Transuranic Package Transporter) or a similar overpack. The TRUPACT uses a double-containment concept. The certified DOT Type B packaging is an overpack designed to protect the cargo against collision, puncture, and fire in case of accident. The preferred shipping route on SRP is from the burial ground to SRP Road C, onto SC Highway 125 and then westward to Augusta. An alternate route is to SRP Road C to SRP Road 2 northward to SC Highway 19.

A Certificate of Compliance for the Nuclear Regulatory Commission (NRC) approved Department of Transportation (DOT) Type B package (packaging plus contents) will authorize use by SRP for offsite shipment of TRU wastes. Limits on contents and package assembly instructions will be included in the Safety Analysis Report for Packaging. Regulatory details are shown in 49 CFR 173.413 "Requirements for Type B Packages" and 10 CFR 71 "Packaging of Radioactive Material for Transport . . ." 10 CFR 71 prescribes the NRC performance criteria for Type B packages and is incorporated by reference in 49 CFR 173.413. DOE Order 5480.3 "Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances and Hazardous Wastes," embraces these regulations.

3.1.4 OFFSITE TRUCK TRANSPORTATION

The "Transportation Assessment and Guidance Report" (DOE-JIO-002) (TAGR) includes discussions of routings from generating sites to the New Mexico area and routings within New Mexico near Carlsbad to the WIPP facilities. The distances for shipments from SRP to the WIPP facility were estimated using an Oak Ridge National Laboratory highway routing model (HIGHWAY). The commercial route is estimated to be 1466 miles. Five routes that maximize use of interstate highways range from 1423 to 1720 miles (see Figure 3-3). If and when additional preferred highways are defined by state routing agencies, there will be potential changes to the overall distances identified here.

The shortest route, Route C, is 1423 miles long and follows I-20 from Augusta through west Texas as shown in Figure 3-3. The longest route, Route E, is 1720 miles and follows I-20 from Augusta to Atlanta, I-85 and I-65 through Montgomery to Mobile, and I-10 from Mobile to west Texas. Alternate Route D is 1660 miles long and follows the same highways as Route E until it leaves I-10 at Houston and turns north to Dallas and then west on I-20. Alternate Route A is 1565 miles long and follows I-20 to Atlanta, I-75 and I-24 to Nashville, I-40 and I-30 through Little Rock to Dallas, and I-20 through west Texas. Alternate Route B is 1649 miles long and follows I-20 to

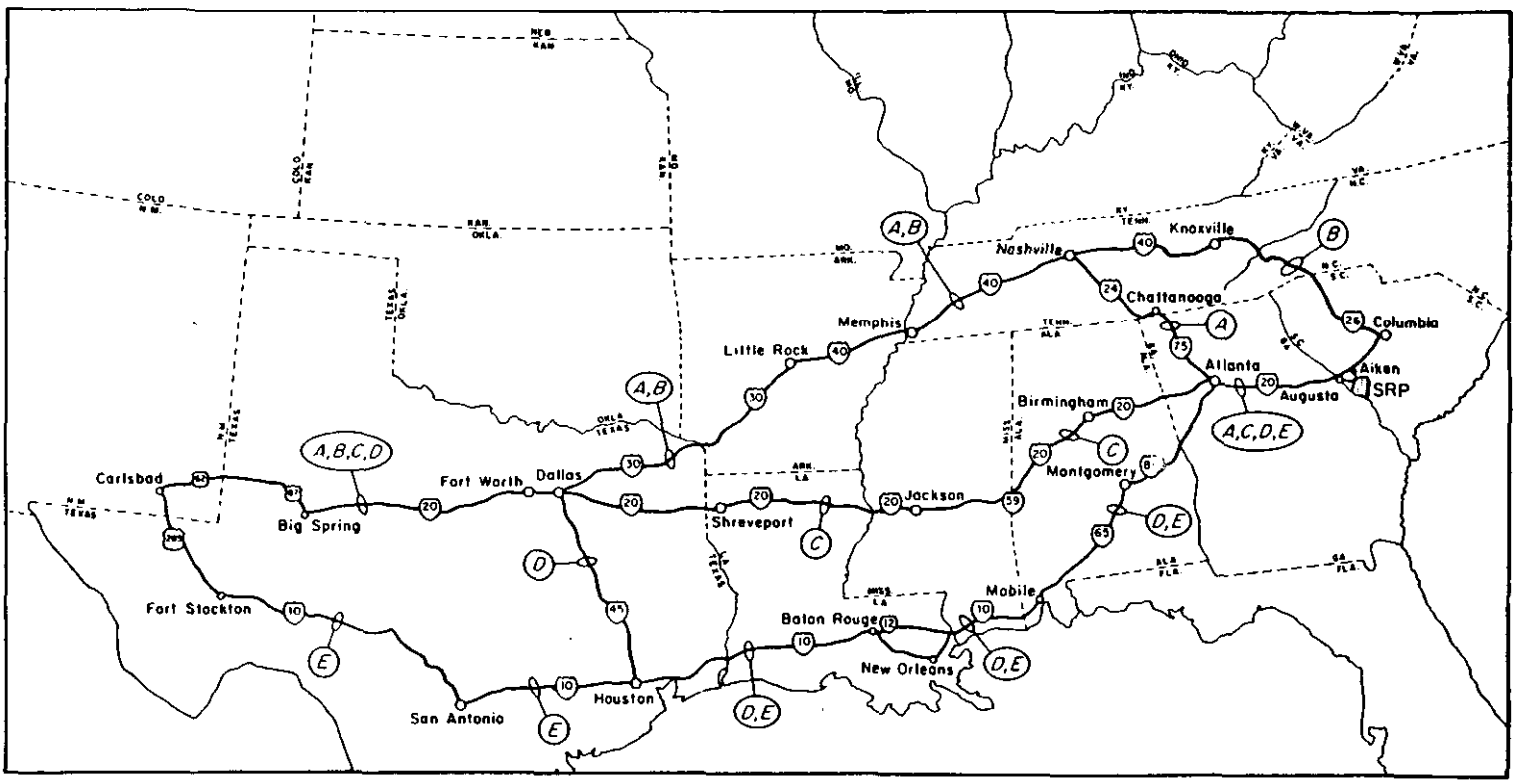


FIGURE 3-3: Potential Truck Routes

Columbia, SC, I-26 and I-40 through Knoxville to Nashville where it joins Route A and follows the same highways to WIPP. The estimated driving time one way for these alternate routes varies from 30 to 36 hours.

3.1.5 OFFSITE RAIL TRANSPORTATION

The TAGR discusses the railroad systems in New Mexico and near WIPP, the need for a new rail line to WIPP and rail interconnections from SRP to WIPP. The INTERLINE rail routing model used in the TAGR analyses incorporates railroad characteristics in predicting likely routes and was used to identify possible alternatives for waste shipments to WIPP. INTERLINE uses a network representation of the U.S. rail system based on the Federal Railroad Administration network assembled in the middle 1970's, and updated to reflect current operations.

The data includes geographical location and characteristics of rail lines such as traffic levels, signal systems, and number of tracks. General routing practices were considered in developing alternative paths to WIPP by varying interline points, and allowing typical routing practices of each rail company considered. Any rail shipments from SRP will travel west through Augusta, GA for interlining. The three potential rail routes considered between SRP and WIPP are shown on Figure 3-4. The INTERLINE model was used to assess the alternate rail routes that vary from 1826 to 2066 miles. Three or four rail companies will be involved in the rail alternatives and elapsed one way shipping time is estimated to be 15 to 18 days.

3.2 ALTERNATIVES

Three documents describing SRP TRU waste management alternatives have been issued. The DOE report, "Alternatives for Long-Term Management of Defense Transuranic Waste at the Savannah River Plant", describes and assesses 30 alternatives for managing both stored and buried SRP TRU solid waste. The supplement to this DOE report assesses four additional management alternatives for retrievably stored waste. The Environmental Information Document prepared by Du Pont on Stored Solid TRU Waste contains a more detailed study of alternatives selected from the thirty-four described in the two previous documents. These alternatives to the proposed action are:

1. No Action/Continue interim storage of TRU waste on storage pads, including newly generated wastes.

2. Overpack containers every 20 years and replace them on storage pads.

3. Onsite disposal.

4. Ship unprocessed waste offsite to the Idaho National Engineering Laboratory for processing and then to WIPP.

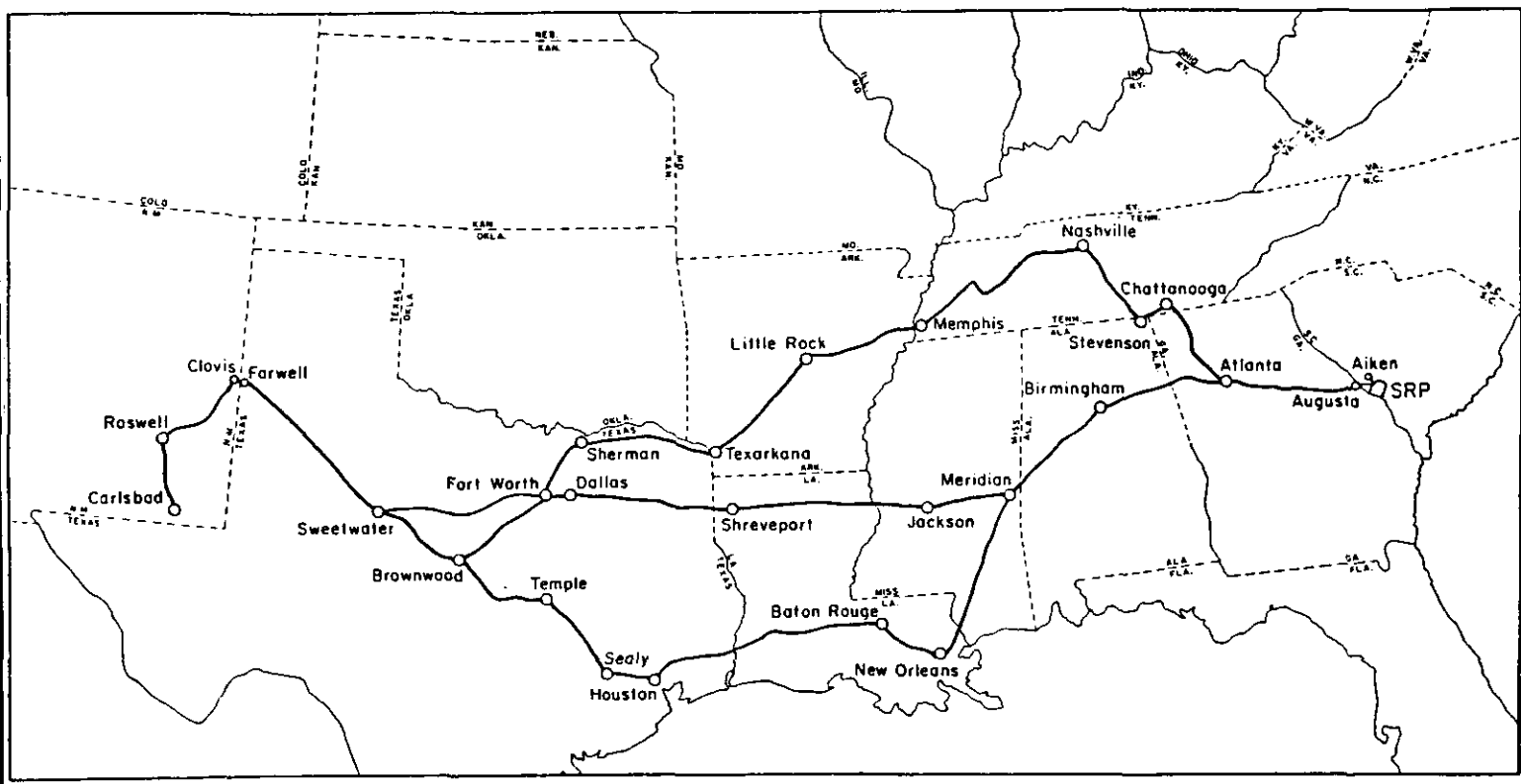


FIGURE 3-4: Potential Rail Routes between SRP and WIPP

3.2.1 NO ACTION/LEAVE TRU WASTE AS IT IS ON STORAGE PADS

Under the no action alternative, there would be no change in existing SRP TRU waste facilities and operations. SRP TRU waste is contained in concrete and steel boxes, culverts, and drums. Packages placed in interim storage on concrete pads were covered with four feet of soil until mid-1985; currently they are covered with tornado netting. Waste will continue to accumulate on the SRP storage pads and four feet of soil will be added. One additional storage pad will be needed every year under this alternative. The storage drums will not last forever; and as they become older and deteriorated, the potential for container failure and contamination of the environment will increase.

Corrosion studies performed by Hoy on nonradioactive test drums by the Savannah River Laboratory showed complete penetration of the galvanized coating on the 55-gallon test drums in localized areas of drums exposed to moisture after four and one-half years of storage. Penetration into the carbon steel had also begun in these localized areas. These results indicate the possibility of environmental contamination from similarly stored TRU waste drums.

This alternative does not meet the objectives of the Defense Waste Management Plan (DWMP) issued by DOE in June 1983. The program described in the DWMP is to end interim storage of TRU waste generated in defense activities and to achieve permanent disposal in a safe and effective manner. This alternative does not provide for the permanent disposal of TRU waste nor allow SRP burial grounds to be closed according to DOE directives.

3.2.2 OVERPACK CONTAINERS EVERY 20 YEARS AND REPLACE THEM ON STORAGE PADS

Under this alternative, TRU waste containers in interim storage would be exhumed every 20 years from the pads and trenches. The waste containers would be inspected, overpacked to ensure their integrity and replaced on surface pads. Waste processing and disposal would be postponed until a later date.

As in the no action alternative, leaving TRU waste in interim storage increases the risk of groundwater contamination or air emissions as a result of container failure and has a potential for containment breaches during retrieval operations. This alternative does not allow SRP burial grounds to be closed according to DOE directives. This alternative also does not provide a method for permanently isolating TRU waste from the biosphere and is thus inconsistent with DOE directives and the DWMP.

3.2.3 ONSITE DISPOSAL

Studies have not been conducted at SRP specifically to determine the technical feasibility of disposing of TRU waste onsite. However, SRP believes that TRU could be disposed in properly engineered concrete vaults in such a way that the requirements of the EPA regulations for the disposal of TRU wastes, "Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste" (40 CFR 191), could be achieved. These vaults would most likely be similar in design to those planned for disposal of radioactive mixed wastes, as described in the "Environmental Impact Statement, Waste Management Activities for Groundwater Protection, SRP," (DOE/EIS-0120). However, no studies are planned to investigate onsite disposal of TRU at SRP because DOE believes that disposal of TRU wastes at WIPP is overall the environmentally preferable alternative.

3.2.4 SHIP UNPROCESSED WASTE OFFSITE TO THE IDAHO NATIONAL ENGINEERING LABORATORY FOR PROCESSING AND THEN TO WIPP

Under this alternative, waste containers in interim storage would be retrieved from pads or trenches and placed in overpacks without processing. The overpacks would be sealed and transported as DOT Type B packages. Since shipping unprocessed waste directly to WIPP does not meet WIPP criteria, all TRU waste at SRP would have to be retrieved and shipped, unprocessed, to an existing processing facility at the Idaho National Engineering Laboratory.

Under this alternative, shipping and handling costs would almost triple over processing at the TWF facility on SRP as the waste is shipped to Idaho and later to WIPP in New Mexico. Increasing shipping distances would also increase the risk of a transportation accident and its adverse publicity. It is advantageous to build the new facility at SRP and thus avoid the need for additional radioactive shipments between the two DOE sites.